

CLAIMS

What is claimed is:

1. A non-aqueous foamer composition, comprising:
 - (a) an alcohol ether sulfate salt;
 - (b) a water miscible solvent; and
 - (c) a polymer selected from the group consisting of natural polymers, modified natural polymers, synthetic polymers, and combinations thereof.
2. The non-aqueous foamer composition, further comprising: (d) a suspending agent.
3. The non-aqueous foamer composition of claims 1 or 2 wherein the alcohol ether sulfate salt is an alkali metal salt, an ammonium salt, or combinations thereof.
4. The non-aqueous foamer composition of claim 3 wherein the alcohol ether sulfate salt comprises the form:
$$C_xH_{2x+1}O(C_2H_4O)_ySO_3M$$
, where x is an integer from about 6 to about 10, y is a value from about 1 to about 10 and $M = Na$ (sodium), K (potassium), NH_4 (ammonium), or combinations thereof.
5. The non-aqueous foamer composition of claim 4 wherein the alcohol ether sulfate salt has x equal from about 6 to about 8, and y is from about 2 to about 4.
6. The non-aqueous foamer of claim 4 wherein the alcohol ether sulfate salt has M preferably as NH_4 (ammonium).
7. The non-aqueous foamer composition of claims 1 or 2 wherein the water miscible solvent is selected from the group consisting of aliphatic alcohols, aliphatic ketones, aliphatic esters, aliphatic glycols, aliphatic polyglycols, aliphatic glycol ethers, and mixtures thereof.

8. The non-aqueous foamer composition of claim 1 or 2 wherein the water miscible solvent is selected from the group consisting of methanol, ethanol, propanol, isopropanol, butanol, isobutanol, furfural alcohol, tetrahydrofurfural alcohol, acetone, methyl ethyl ketone, diethyl ketone, diacetone alcohol, ethylene glycol, propylene glycol, butylene glycol, glycerine, hexylene glycol, ethyl acetate, butyl acetate, ethylene glycol methyl ether acetate, diethylene glycol methyl ether acetate, diethylene glycol, triethylene glycol, tetraethylene glycol, polyethylene glycol, dipropylene glycol, tripropylene glycol, polypropylene glycol, ethylene oxide propylene oxide block copolymers, ethylene glycol methyl ether, ethylene glycol ethyl ether, ethylene glycol butyl ether, ethylene glycol dimethyl ether, ethylene glycol methyl butyl ether, diethylene glycol methyl ether, diethylene glycol butyl ether, diethylene glycol dimethyl ether, diethylene glycol methyl butyl ether, dipropylene glycol methyl ether, dipropylene glycol butyl ether, dipropylene glycol dimethyl ether, triethylene glycol methyl ether, triethyleneglycol butyl ether, tripropylene glycol methyl ether, tripropylene glycol butyl ether, polyoxyethylene butyl ether, polyoxypropylene butyl ether, tetrahydrofuran, dimethylformamide, and combinations thereof.

9. The non-aqueous foamer composition of claim 2 wherein the suspending agent is selected from the group consisting of amorphous and fumed silicas.

10. The non-aqueous foamer composition of claims 1 or 2 wherein the polymer is selected from the group consisting of gum ghatti, gum arabic, gum tragacanth, locust bean gum, gum karaya, guar gum and alkyl, hydroxyalkyl, carboxyalkyl, carboxyalkylhydroxyalkyl and cationic derivatives of guar and mixtures thereof, carrageenan, and alkyl-, hydroxyalkyl-, carboxyalkyl-, hydroxyalkyl carboxyalkyl- derivatives of cellulose, polyimines, poly(acrylic acid), poly(methacrylic acid), poly(maleic acid-co-ethylene), poly(maleic acid-co-

ethylvinylether), poly(maleic acid-co-butylvinylether), poly(maleic acid-co-styrene), poly(maleic acid-co-indene), poly(vinylsulfuric acid), poly(styrenesulfonic acid), dextransulfate, poly(L-glutamic acid), and combinations thereof, hydrophobically modified guar, hydrophobically modified hydroxyalkyl guar, hydrophobically modified carboxyalkyl guar, hydrophobically modified carboxyalkyl hydroxyalkyl guar, hydrophobically modified cationic guar gum, pectin, alginates, gum acacia, alkyl ethers of cellulose, hydroxyalkyl methyl cellulose, hydrophobically modified hydroxyalkyl cellulose, hydrophobically modified carboxyalkyl hydroxyalkyl cellulose, hydrophobically modified carboxyalkyl cellulose, hydrophobically modified alkyl ethers of cellulose, hydrophobically modified hydroxyalkyl methyl cellulose, starch, tara gum, biopolymers such as xanthan gum or welan gum, succinoglucans, and their alkyl, hydroxyalkyl, carboxyalkyl, hydroxyalkyl carboxyalkyl, cationic derivatives, and mixtures thereof.

11. The non-aqueous foamer composition of claims 1 or 2 wherein the polymer is xanthan gum, welan gum, and combinations thereof.
12. The non-aqueous foamer composition of claims 1 or 2 wherein the polymer is methoxypolyethylene glycols of the formula $\text{CH}_3\text{O}-(\text{CH}_2\text{-CH}_2\text{-O})_n\text{-H}$ where n is in the range of 100 to 150.
13. The non-aqueous foamer composition of claims 1 or 2 wherein the polymer is combinations of xanthan gum, welan gum, and methoxypolyethylene glycols of the formula $\text{CH}_3\text{O}-(\text{CH}_2\text{-CH}_2\text{-O})_n\text{-H}$ where n is in the range of 100 to 150.
14. The non-aqueous foamer composition of claim 1 wherein:
 - (a) the alcohol ether sulfate salt concentration ranges from about 10% to about 85% by weight of non-aqueous foamer composition;

(b) the water miscible solvent concentration ranges from about 15% to about 80% by weight of non-aqueous foamer composition; and

(c) the polymer concentration ranges from about 0% to about 10% by weight of non-aqueous foamer composition.

15. The non-aqueous foamer composition of claim 2 wherein:

(a) the alcohol ether sulfate salt concentration ranges from about 10% to about 85% by weight of non-aqueous foamer composition;

(b) the water miscible solvent concentration ranges from about 15% to about 80% by weight of non-aqueous foamer composition;

(c) the polymer concentration ranges from about 0% to about 10% by weight of non-aqueous foamer composition; and

(d) the suspending agent concentration ranges from about 0% to about 15% by weight of non-aqueous foamer composition.

16. The non-aqueous foamer composition of claim 1 wherein:

(a) the alcohol ether sulfate salt is preferred in a concentration range from about 25% to about 65% by weight of non-aqueous foamer composition;

(b) the water miscible solvent concentration is preferred in a range from about 30% to about 65% by weight of non-aqueous foamer composition; and

(c) the polymer concentration is preferred in a range from about 0% to about 10% by weight of non-aqueous foamer composition.

17. The non-aqueous foamer composition of claim 2 wherein:

(a) the alcohol ether sulfate salt is preferred in a concentration range from about 25% to about 65% by weight of non-aqueous foamer composition;

(b) the water miscible solvent concentration is preferred in a range from about 30% to about 65% by weight of non-aqueous foamer composition;

(c) the polymer concentration is preferred in a range from about 1% to about 7% by weight of non-aqueous foamer composition; and

(d) the suspending agent concentration is preferred in a range from about 1% to about 10% by weight of non-aqueous foamer composition.

18. The non-aqueous foamer composition of claim 1 wherein:

(a) the alcohol ether sulfate salt is most preferred in a concentration range from about 36% to about 60% by weight of non-aqueous foamer composition;

(b) the water miscible solvent concentration is most preferred in a range from about 36% to about 55% by weight of non-aqueous foamer composition; and

(c) the polymer concentration is most preferred in a range from about 0% to about 7% by weight of non-aqueous foamer composition.

19. The non-aqueous foamer composition of claim 2 wherein:

(a) the alcohol ether sulfate salt is most preferred in a concentration range from about 36% to about 60% by weight of non-aqueous foamer composition;

(b) the water miscible solvent concentration is most preferred in a range from about 36% to about 55% by weight of non-aqueous foamer composition;

(c) the polymer concentration is most preferred in a range from about 2% to about 6% by weight of non-aqueous foamer composition; and

(d) the suspending agent concentration is most preferred in a range from about 2% to about 7% by weight of non-aqueous foamer composition.

20. The non-aqueous foamer composition of claim 1 wherein the alcohol ether sulfate concentration is 60% and the water miscible solvent concentration is 40%.

21. The non-aqueous foamer composition of claim 2 wherein the alcohol ether sulfate concentration is 45.9%, the water miscible solvent concentration is 45.9%, the polymer concentration is 4.6%, and the suspending agent concentration is 3.6%.

22. An aqueous foamer composition, comprising:

- (a) an alcohol ether sulfate salt;
- (b) water miscible solvent;
- (c) polymer; and
- (d) water.

23. The aqueous foamer composition of claim 22 wherein the alcohol ether sulfate salt is an alkali metal salt, an ammonium salt, or combinations thereof.

24. The aqueous foamer composition of claim 23 wherein the alcohol ether sulfate salt comprises the form:

$C_xH_{2x+1}O(C_2H_4O)_ySO_3M$, where x is an integer from about 6 to about 10, y is a value from about 1 to about 10 and $M = \text{Na}$ (sodium), K (potassium), NH_4 (ammonium), or combinations thereof^f.

25. The aqueous foamer composition of claim 24 wherein the alcohol ether sulfate salt has M as NH_4 (ammonium).

26. The aqueous foamer composition of claim 22 wherein the water miscible solvent is selected from the group consisting of aliphatic alcohols, aliphatic ketones, aliphatic esters, aliphatic glycols, aliphatic polyglycols, aliphatic glycol ethers, and mixtures thereof.

27. The aqueous foamer composition of claim 22 wherein the water miscible solvent is selected from the group consisting of methanol, ethanol, propanol, isopropanol, butanol, isobutanol, furfural alcohol, tetrahydrofurfural alcohol, acetone, methyl ethyl ketone, diethyl ketone, diacetone alcohol, ethylene glycol, propylene glycol, butylene glycol, glycerine, hexylene glycol, ethyl acetate, butyl acetate, ethylene glycol methyl ether acetate, diethylene glycol methyl ether acetate, diethylene glycol, triethylene glycol, tetraethylene glycol, polyethylene glycol, dipropylene glycol, tripropylene glycol, polypropylene glycol, ethylene oxide propylene oxide block copolymers, ethylene glycol methyl ether, ethylene glycol ethyl ether, ethylene glycol butyl ether, ethylene glycol dimethyl ether, ethylene glycol methyl butyl ether, diethylene glycol methyl ether, diethylene glycol butyl ether, diethylene glycol dimethyl ether, diethylene glycol methyl butyl ether, dipropylene glycol methyl ether, dipropylene glycol dimethyl ether, triethylene glycol methyl ether, triethyleneglycol butyl ether, tripropylene glycol methyl ether, tripropylene glycol butyl ether, polyoxyethylene butyl ether, polycxypropylene butyl ether, tetrahydrofuran, dimethylformamide, and combinations thereof.

28. The aqueous foamer composition of claim 22 wherein the polymer is selected from the group consisting of gum ghatti, gum arabic, gum tragacanth, locust bean gum, gum karaya, guar gum and alkyl, hydroxyalkyl, carboxyalkyl, carboxyalkyl-hydroxyalkyl and cationic derivatives of guar and mixtures thereof, carrageenan, and alkyl-, hydroxyalkyl-, carboxyalkyl-, hydroxyalkyl carboxyalkyl- derivatives of cellulose, polyimines, poly(acrylic acid), poly(methacrylic acid), poly(maleic acid-co-ethylene), poly(maleic acid-co-ethylvinylether), poly(maleic acid-co-butylvinylether), poly(maleic acid-co-styrene), poly(maleic acid-co-indene), poly(vinylsulfuric acid), poly(styrenesulfonic acid),

dextransulfate, poly(L-glutamic acid), and combinations thereof, hydrophobically modified guar, hydrophobically modified hydroxyalkyl guar, hydrophobically modified carboxyalkyl guar, hydrophobically modified carboxyalkyl hydroxyalkyl guar, hydrophobically modified cationic guar gum, pectin, alginates, gum acacia, alkyl ethers of cellulose, hydroxyalkyl methyl cellulose, hydrophobically modified hydroxyalkyl cellulose, hydrophobically modified carboxyalkyl hydroxyalkyl cellulose, hydrophobically modified carboxyalkyl cellulose, hydrophobically modified alkyl ethers of cellulose, hydrophobically modified hydroxyalkyl methyl cellulose, starch, tara gum, biopolymers such as xanthan gum or welan gum, succinoglucans, and their alkyl, hydroxyalkyl, carboxyalkyl, hydroxyalkyl carboxyalkyl, cationic derivatives, and mixtures thereof.

29. The aqueous foamer composition of claim 22 wherein the polymer is xanthan gum, welan gum, and combinations thereof.
30. The aqueous foamer composition of claim 22 wherein the polymer is methoxypolyethylene glycols of the formula $\text{CH}_3\text{O}-(\text{CH}_2-\text{CH}_2-\text{O})_n-\text{H}$ where n is in the range of 100 to 150.
31. The aqueous foamer composition of claim 22 wherein the polymer is combinations of xanthan gum, welan gum, and methoxypolyethylene glycols of the formula $\text{CH}_3\text{O}-(\text{CH}_2-\text{CH}_2-\text{O})_n-\text{H}$ where n is in the range of 100 to 150.
32. The aqueous foamer composition of claim 22 wherein:
 - (a) the alcohol ether sulfate salt concentration ranges from about 15% to about 85% by weight of aqueous foamer composition;
 - (b) the water miscible solvent concentration ranges from about 1% to about 40% by weight of aqueous foamer composition;

- (c) the polymer concentration ranges from about 0% to about 10% by weight of aqueous foamer composition; and
- (d) water forming the balance to 100%.

33. The aqueous foamer composition of claim 22 wherein:

- (a) the alcohol ether sulfate salt is preferred in a concentration range from about 25% to about 70% by weight of aqueous foamer composition;
- (b) the water miscible solvent concentration is preferred in a range from about 3% to about 30% by weight of aqueous foamer composition;
- (c) the polymer concentration is preferred in a range from 0% to about 7% by weight of aqueous foamer composition; and
- (d) water forming the balance to 100%.

34. The aqueous foamer composition of claim 22 wherein:

- (a) the alcohol ether sulfate salt is most preferred in a concentration range from about 35% to about 60% by weight of aqueous foamer composition;
- (b) the water miscible solvent concentration is most preferred in a range from about 5% to about 15% by weight of aqueous foamer composition;
- (c) the polymer concentration is most preferred in a range from 0% to about 5% by weight of aqueous foamer composition; and
- (d) water forming the balance to 100%.

35. The aqueous foamer composition of claim 22 wherein the alcohol ether sulfate concentration is 59.5%, the water miscible solvent concentration is 10.5%, and the water concentration is 30%.

36. A solid/semi-solid foamer composition, comprising:

- (a) an alcohol ether sulfate salt;
- (b) an adsorbing/absorbing agent; and
- (c) a polymer selected from the group consisting of natural polymers, modified natural polymers, synthetic polymer, and combinations thereof.

37. The solid/semi-solid foamer composition of claim 36, further comprising: (d) a free-flowing agent.

38. The solid/semi-solid foamer composition of claims 36 or 37 wherein the alcohol ether sulfate salt is an alkali metal salt, an ammonium salt, or combinations thereof.

39. The solid/semi-solid foamer composition of claim 38 wherein the alcohol ether sulfate salt comprises the form: $C_xH_{2x+1}O(C_2H_4O)_ySO_3M$, where x is an integer from about 6 to about 10, y is a value from about 1 to about 10 and $M = Na$ (sodium), K (potassium), NH_4 (ammonium), or combinations thereof.

40. The solid/semi-solid foamer composition of claim 39 wherein the alcohol ether sulfate salt has x equal from about 6 to about 8, and y is from about 2 to about 4.

41. The solid/semi-solid foamer composition of claim 39 wherein said alcohol ether sulfate salt has M preferably as NH_4 (ammonium).

42. The solid/semi-solid foamer composition of claims 36 or 37 wherein the adsorbing/absorbing agent is ammonium and alkaline metal carbonate, silicas, light soda ash, diatomaceous earth, zeolite, micas and other like adsorbing/absorbing agents.

43. The solid/semi-solid foamer composition of claims 36 or 37 wherein the polymer is selected from the group consisting of gum ghatti, gum arabic, gum tragacanth, locust bean gum, gum karaya, guar gum and alkyl, hydroxyalkyl, carboxyalkyl, carboxyalkylhydroxyalkyl and

cationic derivatives of guar and mixtures thereof, carrageenan, and alkyl-, hydroxyalkyl-, carboxyalkyl-, hydroxyalkyl carboxyalkyl- derivatives of cellulose, polyimines, poly(acrylic acid), poly(methacrylic acid), poly(maleic acid-co-ethylene), poly(maleic acid-co-ethylvinylether), poly(maleic acid-co-butylinylether), poly(maleic acid-co-styrene), poly(maleic acid-co-indene), poly(vinylsulfuric acid), poly(styrenesulfonic acid), dextransulfate, poly(L-glutamic acid), and combinations thereof, hydrophobically modified guar, hydrophobically modified hydroxyalkyl guar, hydrophobically modified carboxyalkyl guar, hydrophobically modified carboxyalkyl hydroxyalkyl guar, hydrophobically modified cationic guar gum, pectin, alginates, gum acacia, alkyl ethers of cellulose, hydroxyalkyl methyl cellulose, hydrophobically modified hydroxyalkyl cellulose, hydrophobically modified carboxyalkyl hydroxyalkyl cellulose, hydrophobically modified carboxyalkyl cellulose, hydrophobically modified alkyl ethers of cellulose, hydrophobically modified hydroxyalkyl methyl cellulose, starch, tara gum, biopolymers such as xanthan gum or welan gum, succinoglucans, and their alkyl, hydroxyalkyl, carboxyalkyl, hydroxyalkyl carboxyalkyl, cationic derivatives, and mixtures thereof.

44. The solid/semi-solid foamer composition of claims 36 or 37 wherein the polymer is xanthan gum, welan gum, and combinations thereof.
45. The solid/semi-solid foamer composition of claims 36 or 37 wherein the polymer is methoxypolyethylene glycols of the formula $\text{CH}_3\text{O}-(\text{CH}_2\text{-CH}_2\text{-O})_n\text{-H}$ where n is in the range of 100 to 150.
46. The solid/semi-solid foamer composition of claims 36 or 37 wherein the polymer is combinations of xanthan gum, welan gum, and methoxypolyethylene glycols of the formula $\text{CH}_3\text{O}-(\text{CH}_2\text{-CH}_2\text{-O})_n\text{-H}$ where n is in the range of 100 to 150.

47. The solid/semi-solid foamer composition of claim 37 wherein the free-flowing agent is selected from the group consisting of amorphous and fumed silicas.

48. The solid/semi-solid foamer composition of claim 36 wherein:

- (a) the alcohol ether sulfate salt concentration ranges from about 15% to about 85% by weight of foamer composition;
- (b) the adsorbing/absorbing agent concentration ranges from about 0% to about 70% by weight of foamer composition; and
- (c) the polymer concentration ranges from about 0% to about 85% by weight of foamer composition.

49. The solid/semi-solid foamer composition of claim 37 wherein:

- (a) the alcohol ether sulfate salt concentration ranges from about 15% to about 85% by weight of foamer composition;
- (b) the adsorbing/absorbing agent concentration ranges from about 0% to about 70% by weight of foamer composition;
- (c) the polymer concentration ranges from about 0% to about 85% by weight of foamer composition; and
- (d) the free-flowing agent concentration ranges from about 0% to about 50% by weight of foamer composition.

50. The solid/semi-solid foamer composition of claim 36 wherein:

- (a) the alcohol ether sulfate salt is preferred in a concentration range from about 20% to about 60% by weight of foamer composition;
- (b) the adsorbing/absorbing agent concentration is preferred in a range from about 10% to about 60% by weight of foamer composition; and

(c) the polymer concentration is preferred in a range from about 10% to about 60% by weight of foamer composition.

51. The solid/semi-solid foamer composition of claim 37 wherein:

(a) the alcohol ether sulfate salt is preferred in a concentration range from about 20% to about 60% by weight of foamer composition;

(b) the adsorbing/absorbing agent concentration is preferred in a range from about 10% to about 60% by weight of foamer composition;

(c) the polymer concentration is preferred in a range from about 10% to about 60% by weight of foamer composition; and

(d) the free-flowing agent concentration is preferred in a range from about 1% to about 30% by weight of foamer composition.

52. The solid/semi-solid foamer composition of claim 36 wherein:

(a) the alcohol ether sulfate salt is most preferred in a concentration range from about 28% to about 51% by weight of foamer composition;

(b) the adsorbing/absorbing agent concentration is most preferred in a range from about 20% to about 52% by weight of foamer composition; and

(c) the polymer concentration is most preferred in a range from about 20% to about 51% by weight of foamer composition.

53. The solid/semi-solid foamer composition of claim 37 wherein:

(a) the alcohol ether sulfate salt is most preferred in a concentration range from about 28% to about 51% by weight of foamer composition;

(b) the adsorbing/absorbing agent concentration is most preferred in a range from about 20% to about 52% by weight of foamer composition;

(c) the polymer concentration is most preferred in a range from about 20% to about 51% by weight of foamer composition; and

(d) the free-flowing agent concentration is most preferred in a range from about 1% to about 10% by weight of foamer composition.

54. The solid/semi-solid foamer composition of claim 36 wherein the alcohol ether sulfate concentration is 29%, the polymer concentration is 30%, and the absorbing agent is 41%.

55. The solid/semi-solid foamer composition of claim 37 wherein the alcohol ether sulfate concentration is 31.7%, the polymer concentration is 34.9%, the absorbing agent is 26.7%, and the free-flow agent is 6.7%.

56. A foam, comprising:

- (a) the non-aqueous foamer composition of claim 1 or claim 2, or the aqueous foamer composition of claim 22, or the solid/semi-solid foamer composition of claim 36 or claim 37;
- (b) aqueous solution or water; and
- (c) gas.

57. The foam of claim 56 wherein the aqueous solution is selected from the group consisting of natural-fresh and brackish waters, sea water, sodium-, potassium-, and ammonium-chloride brines, waters acidified by the presence of hydrochloric, sulfuric, acetic, formic acid, or mixtures thereof, and alkali waters made alkaline by the presence of salts of hydroxides, carbonates, bicarbonates, and mixtures thereof.

58. The foam of claim 56 wherein the gas fraction ranges from about 5 percent of the total weight of the foam to about 95 percent of the total weight of the foam, the balance being

made up from the aqueous solution or water and one of the foamer compositions of claims 1, 2, 22, 36, and 37.

59. A method of foaming an aqueous solution, comprising adding to the aqueous solution a non-aqueous foamer composition, comprising an alcohol ether sulfate salt, a water miscible solvent, and a polymer selected from the group consisting of natural polymers, modified natural polymers, synthetic polymers, and combinations thereof to form an aqueous foam.

60. The method of claim 59 wherein the aqueous foam may be contacted by contaminants including hydrocarbons, alcohols, brines, hardness ions, acids, bases, and combinations thereof.

61. The method of claim 60 wherein the contaminants, separately or collectively, may comprise up to about 50% of the aqueous fraction of the foam, by weight.

62. A method of foaming an aqueous solution, comprising making the aqueous solution acidic by adding up to about 30% by weight mineral acid through the addition of a non-aqueous foamer comprising an alcohol ether sulfate, a water miscible solvent, and a polymer selected from the group consisting of natural polymers, modified natural polymers, synthetic polymers, and combinations thereof to form an aqueous-acid foam.

63. The method of claim 62 wherein the aqueous-acid foam may be contacted by contaminants including hydrocarbons, alcohols, brines, hardness ions, acids, bases, and combinations thereof.

64. The method of claim 63 wherein the contaminants, separately or collectively, may comprise up to about 50% by weight of the aqueous-acid fraction of the foam.

65. The method of claims 60 or 63 wherein the alcohols are aliphatic alcohols having less than 7 carbons.

66. The method of claims 60 or 63 wherein the acids are mineral acids, carboxylic acids, and combinations thereof.

67. The method of claim 66 wherein the mineral acids may be selected from the group consisting of hydrochloric acid, hydrofluoric acid, sulfuric acid, nitric acid, phosphoric acid, boric acid, and combinations thereof.

68. The method of claim 66 wherein the carboxylic acids may be selected from the group consisting of formic acid, acetic acid, propionic acid, citric acid, lactic acid, tartaric acid, glycolic acid, and combinations thereof.

69. The method of claims 60 or 63 wherein the bases are alkaline oxides, hydroxides, carbonates, amines, and combinations thereof.

70. The method of claim 69 wherein the alkaline oxides may be selected from the group consisting of calcium oxide, magnesium oxide, and combinations thereof.

71. The method of claim 69 wherein the hydroxides may be selected from the group consisting of sodium hydroxide, potassium hydroxide, ammonium hydroxide, calcium hydroxide, magnesium hydroxide, and combinations thereof.